DOCUMENT RESUME

ED 123 205 SP 010 089

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TITLE The Various Teacher: Subject Matter, Style, and Strategy in the Primary Classroom.
PUB DATE Apr 76
NOTE 30p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, California, April 19-23, 1976)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Educational Research; Elementary Education; Grade 3; Mathematics; *Primary Education; Primary Grades; Reading; Self Contained Classrooms; *Teachers; *Teaching Methods; *Teaching Procedures; *Teaching Techniques

ABSTRACT

This study describes some of the differences in the way primary teachers work with different school subjects. The activities during reading and arithmetic instruction in six third grade, inner-city, self-contained classrooms were observed, tape-recorded, and analyzed using three systems of observation. A total of five hours of instruction in reading and three hours of arithmetic instruction were submitted to a series of content analyses. The major differences discovered included a marked "negativity" during reading instruction. This reason was hypothesized to lie with the intrinsic difficulties in teaching the subject relative to the more "transparent" characteristics of arithmetic. In addition, reading was also characterized by a greater degree of "control" by the teacher and at the same time, arithmetic instruction was characterized by more student-initiated interactions. The discovery of inner-teacher differences correlated with differences in the primary curriculum calls into question the interpretation of criteria from observational systems such as Flanders' Interaction Analysis Categories as measures of internal conditions (e.g., personality) in the teachers. The meaning of at least some criterion activities is more probably that these reflect some external forces acting on the classroom, particularly the curriculum. (Author/RC)

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The Various Teacher:
Subject Matter, Style, and Strategy
In the Primary Classroom*

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SP 010 089

Introduction

The primary teacher in a self-contained classroom is called upon to perform myriad tasks throughout the day. The sum of these activities, both academic and procedural (Jackson and Lahaderne, 1967), can be termed the "work" of the teacher. But how is such a protean set of events to be described and comprehended? A number of approaches have been applied to the problem, but they can be summarized as deriving from one of two points of view. One approach to the work of the teacher is essentially "behavioristic," deriving from observational studies intended merely to describe the ongoing events in the classroom. Flanders' Interaction Analysis Categories (FIAC) are probably the most widely known example. A second approach to teaching and learning in classroom settings is more prescriptive and derives largely from curricular sources, particularly those concerned with teaching "methods." It would not be unfair to characterize these two approaches to classrooms as independent of one another. The "behaviorists" rarely betray any interest in the curricular aims of the teachers they are observing, although these

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*Paper presented at 1976 Annual meeting of the American Educational Research Association, San Francisco, California, April 19--23, 1976.

must be operating to affect classroom behavior.[1] But just how the subject matter being taught operates to influence the class' activities is unfortunately not made clear by reference to curricular resources and writings. Those who deal with curricular matters seldom do so at the concrete, real-life, flesh-and-blood level of teaching that the behaviorally oriented observers do.[2] Thus while it is true that material on "methods" of teaching are meant to be directly translatable into effective activities in the classroom, in actuality those sources are at some remove from the workaday problems and behavior of the classroom teacher.

The fact that there is little overlap between what the behavioristically oriented observers measure and what the prescriptively oriented curricular writers suggest should constitute "methods" of teaching means that we cannot pretend to comprehend the work of the teacher in the real-life classroom with any completeness. What is required is a bridge between observable behavior and the functions and purposes that it seems to fulfill. The gap between the behaviorists and the curricular theorists is, in a sense, simply a reiteration of the traditionally troublesome dichotomy between theory and practice. Can the gap be bridged? Some efforts by Schwab (1969, 1971, 1973) are encouraging, clearly a promising beginning to a complex task. In dealing with the "commonplaces" of the classroom--teacher, student, curriculum, and milieu--Schwab is persuasive in arguing that one of the elements cannot be excluded except at the expense of the others and of completeness of understanding. Still, the operation of the "commonplaces" in specific settings such as the primary, self-contained room remain to be explicated.

By conceptualizing the classroom as a "workplace" (Dreeben, 1973), one means of dealing with its several elements can be initiated. A central concept in

Dreeben's work is the notion of technology (Dreeben, 1970, 1973). Briefly, he articulates a means of defining a "technology of teaching" by dealing with some of the "linkages" between the commonplaces of the classroom. Using his notion, one asks how the teacher brings about in her[3] students an acceptable level of performance with the curricular materials at hand. The question may be answered in a number of ways, but one leads to an examination of the activities taking place during different subject-matter lessons, such as reading compared with arithmetic. In primary classrooms, three "commonplace" elements—teacher, students, and milieu--remain constant, while the fourth, curriculum, varies. A primary room, then, can provide an interesting "naturalistic" setting in which some data on the "linkages" between the elements can be defined with clarity, since the variability due to teacher "style," or different samples of students, is eliminated. Note that if the teacher were to vary in her activities during instruction in two subjects such as reading and arithmetic, the nature of the variations will suggest how the teacher responds to differences within the curriculum. If a "technology of teaching" is operating, the "linkages" between the teacher's behavior and changes in the subject matter being taught should systematically differ. An example should clarify the point.

If reading were harder to teach and learn than arithmetic, the students will probably make more mistakes in the former subject, necessitating the teacher's correcting them. Thus one possible linkage between a teaching activity--feedback on errors--and differences in subject matter is revealed. Observations of the primary teacher's work during reading compared with arithmetic can be expected to reveal a higher proportion of feedback in the former subject. It seems entirely possible to construct, on a priori grounds, some predictions of how the primary teacher's activities will vary from one subject area to the next, particularly in two such

strongly contrasting ones as reading and arithmetic. Indeed, it is those two subjects that are the basis for comparisons of primary teacher's work done here.

A detailed rationale comparing reading with arithmetic has been developed, but is too extensive to include here (see Soltz, 1976). A summary is provided later in this paper (see Table 1). My general hypothesis is as follows: A primary teacher will look more like other teachers working with the same subject matter than like herself teaching different subjects. In effect, the hypothesis suggests that any of the activities that behavioristically oriented observers have measured may be linkages that vary from one subject area to the next. Thus, teacher behavior such as "praise," "lecturing," or "asking questions" (items from FIAC) could vary significantly in the work of one teacher. For example, more "lecturing" might be observed during a teacher's work with arithmetic than reading. If this difference were sizeable enough to achieve statistical significance, it would strongly suggest that the subject matter, not the teacher's "style," was determining its proportional appearance in the teacher's repertoire of instructional activities. Indeed, the hypothesis implicates any activity categorized by observers of classrooms as potentially affected by curricular variation, hence designatable as a "linkage."[4]

The discovery of systematic differences in the activities of a primary teacher during reading as compared to arithmetic has implications for observational workers and curricular theorists. For the behavioristically oriented, significant systematic differences in their criterion activities within a single teacher would require some reassessment of their theoretical underpinnings. For example, resort to an explanation of the amount of "teacher talk" that is based on her personality her "style," or other presumably stable qualities within the teacher, is not pos-

sible. How can differences within the teacher be accounted for with a constant factor? Indeed, if the behavioral measures claimed to measure "style" really did, they should not vary signiificantly from one lesson to the next.

Systematic, within-teacher differences in activities correlated with different subject matters would be valuable for the curricular theorist in suggesting what structural qualities existing in real-life classrooms were salient for the teacher. The theorists might then be in a better position to prescribe methods of instruction that were tailored to fit reality more closely.

It remains to specify precisely which activities during teaching are likely to be influenced by differences in the subject matter. Without a previous basis for determining the most appropriate criteria, my approach will be exploratory. I shall simply select a number of activities from three existing classroom observational systems to serve as criteria to measure the changes in a classroom's work when it moves from reading to arithmetic. If classroom teaching is comprised of a number of common, easily observed activities such as those measured by standard observational systems (Travers, 1971; Gage and Berliner, 1975), then at least some of these may be expected to be proportionately different during reading compared to arithmetic. I shall briefly work out the rationale for my expectations of how the 36 criterion measures will be affected by a change in subject matter.

First, from the FIAC, a number of the communicational activities used as criteria should differ when a teacher's instructional work with reading is contrasted with that in arithmetic. The amount of "talking" done by a teacher in a reading lesson should be proportionately smaller than that done in arithmetic. More specifically, most of the criteria defined by Flanders should be affected because my expectation is that during reading a larger proportion of classroom time must be given to "student talk." Each student's oral reading must be care-

fully monitored by the teacher and their are no easy means of accomplishing this with the whole class. A teacher typically works with small subgroups of the whole class, and within these, with each student, one at a time in round-robin fashion. What this use of time for student activity results in, in effect, is less time for the teacher to "talk." Hence, all measures of teacher activity, save two, are predicted to be significantly greater for a given teacher during arithmetic than during reading. The two exceptions are made for "criticism" and "feedback." These items, when observed during reading and arithmetic and compared as to their relative frequencies of occurrence should be observed significantly more often during reading. This will be due to the difficulty of that subject. That is, the teacher is expected to "reflect" the difficulty of the subject of reading by devoting a more sizeable portion of her "talk" to correcting students or criticizing them.

I expect that some students' activities will differ from reading to arithmetic as well. Among those most likely to be different during work in the two subject areas, I include the amount of "student talk," which should be greater during reading if "oral reading" is included in its tabulation. Additional activities that should differ include the number of "unelicited responses" (higher during reading), the amount of "directed activity" (higher during arithmetic), and the proportion of time given to "demonstration" (higher during arithmetic).

Another view of the educational processes taking place during reading and arithmetic can be obtained from classifying them with a system defined by Jackson and Lahaderne (1967). It focusses attention on the interactions between the teacher and individual students, categorizing their nature (academic, procedural, or disciplinary) and their resolution (negative, positive, neutral, or no feedback). Based on the deduction that reading is more "aversive" (Staats and Staats, 1962) or negative than arithmetic, my prediction is that academic interactions during reading instruction will result in more negative resolutions than arithmetic,

but that relatively more positive resolutions will be observed in the latter subject area. It also seems predictable that there should be more teacher-initiated academic interactions during reading instruction than arithmetic. This is contrary to the expectation of more student participation because of the small-group setting of reading. The prediction of tighter teacher control is based largely on descriptions of reading groups in third-grade classrooms by Gump (1967).

A closer examination of the nature of the feedback given during reading and arithmetic is afforded by Brophy and Good's system (1974). Because of difficulties inherent in the reading process, more interruptions of students by teachers will take place in that subject area, as well as more affirmations by the teacher of incorrect answers, more criticism, and more provisions of the correct answer to the student. These predictions are made relative to the instruction by a given teacher in arithmetic

To summarize, my contention is that differences in the subjects being taught by the primary teacher in a self-contained classroom will be manifested as differences in the proportional appearance of activities defined as criteria by three existing observational systems. My hypotheses are summarized in Table 1.

Insert Table 1 about here.

Method

The activities occuring during reading and arithmetic instruction in six, third-grade, inner-city classrooms were observed, tape-recorded, and analyzed using the three systems of observation already noted. The observations were done in regular, traditional, self-contained classrooms where the teachers were responsible for reading and arithmetic instruction and the population of children within the rooms was constant throughout the day.

Coding. A total of roughly five hours of instruction in reading, three in arithmetic were submitted to a series of content analyses. All instances in which one of the 36 criterion activities was observed were tallied and classified as to their source. Thus each tally of a given activity -- say praise -- was located according to which of the six classrooms it originated from and which of the two subject areas were involved. The end result of this coding procedure was three 6 X 2 X n matrix (6 = number of classrooms, 2 = number of subjects observed, n = the number of criterion activities from a given coding system). These 3 matrices (one for each coding system) each summarized the number of times a given activity was observed. The summed tallies of the 36 criterion activities in reading and in arithmetic within the six classrooms were then transformed to neutralize the different lengths of lesson time (which were allowed to vary naturalistically) by summing all the tallies of a given activity within a given subject area for a given teacher, then dividing by the total amount of time in minutes spent by the class in the subject area. This resulted in a figure representing all of the observations of an activity per minute of instructional time during reading and during arithmetic.

Comparisons of how teachers spent their time during reading and arithmetic instruction were then made possible. This allowed such questions as the following to be asked of each of the 36 criterion measures in turn: Does a teacher praise students more during arithmetic than reading? The answer to the question can be obtained by deriving a difference "score" for each teacher on the criterion activity. Thus the average number of tallies per minute of arithmetic instruction was subtracted from the amount given during reading instruction in a classroom. The arithmetic sign of the difference indicates which subject area -- reading

or arithmetic -- tends to have a larger proportion of the activity. The size of the differences in the six classrooms sampled can be tested with "Student's" t-distribution.

Statistical Analysis. A t-test provides information directly relevant to the general hypothesis. The size of the differences in teachers' work that can be traced to different subject matters is compared to the pooled differences among the six teachers deriving from other sources, such as variations in style, personality, or student populations. The ratio of within-teacher to among-teacher differences thus tests whether teachers look "like themselves" or others when teaching different subject areas.

Results

Summaries of the tests for differences between reading and arithmetic instruction are provided in Tables 2, 3, 4, and 5. The tables summarize seperate tests of the hypothesis, based on criteria derived from three observational systems.

FIAC Criteria. Drawing on the work of Flanders, 18 criteria were derived to test whether the forms of "teacher talk" and "student talk" differ during reading compared with arithmetic. Table 2 depicts the results of those tests.

Insert Table 2 about here.

Strong differences between work in reading as compared with arithmetic can be noted on four of the 18 items. The six teachers provided significantly more "information" during arithmetic instruction (item 7) than during reading. Students

during reading clearly read orally significantly more of the time than during arithmetic (item 12). But they also made more unelicited remarks during reading than arithmetic (item 13). Significantly larger amounts of time are given to "student demonstrations" during arithmetic (item 17).

With somewhat less certainty, seven of the differences between a classroom's work in reading and arithmetic were consistent with the hypothesis, but fell short of a level of statistical significance that would allow the conclusion that the two subject areas were unequivocably dissimilar. The teachers during reading tended to accept more "affective input" from students than during arithmetic (item 1). The teachers during arithmetic tended to ask more "narrow questions" than when instructing reading. A tendency complimentary to this was detected in which the students during arithmetic emitted more "elicited responses" (i.e., short answers to questions; item 11) than during reading. In contrast, "broad questions" tended to be more prominent during reading than during arithmetic in the instructional activities of the six teachers (item 5). Item 8, feedback by the teacher to students who have given incorrect responses, tends to be more frequent during a teacher's work in reading. Finally, students were observed somewhat more often to be engaged in "directed activity" during arithmetic (item 15), such as working problems from "workbooks" at their seats. There is also a tendency for students during reading to exhibit more "silence" or "contemplation" (item 16).

Summarizing, of the 18 different activities used to measure whether teachers and students differ in how they work with reading compared to arithmetic, 3 clearly supported the hypothesis, 3 more were consistent with the hypothesis, and 4 marginally significant results were not. The remaining 8 comparisons of reading

with arithmetic indicated there were no significant differences in how activities went on during instruction in the two subjects. One of these comparisons, involving the degree of "confusion" and "irrelevant activity" ongoing (item 18) was predicted to result in a statistically nonsignificant conclusion and did.

Discussion. The finding that significantly more oral reading takes place during work in reading than arithmetic is clearly not surprising. What is worth noting is what might be considered a somewhat modest proportion of the activity relative to the total amount of time expended. Translated into rough figures, somewhere between one-third and one-half of the time during which reading instruction is ongoing is devoted to children's actually reading the textual material.

The finding that more "unelicited remarks" were made by students during reading than during arithmetic is something of a surprise. It suggests that work during reading must evoke more "opinions, feelings, and judgments" from the children than arithmetic. The surprising aspect of the finding is that with time constrictions so pressing during reading, the teacher allows this relatively unstructured event to take place with greater frequency than during arithmetic. This may be traced to two differences between the subjects. First, reading instruction typically does call for some interpretive input by students. They were frequently asked whether they found the story "interesting," for example, a question calling for an answer categorized by the FIAC as an "unelicited response." Second, the very low frequency of the activity's occurrence during either reading or arithmetic sessions no doubt affected the statistical comparison involved in the t-test.

That the teacher qua arithmetic teacher provides students with more information than she does when dealing with reading may very well be due to the more transparent qualities of arithmetic in the third-grade classroom. The whole number operations

involved in arithmetic probably lend themselves more easily to a "telling" or "talking" orientation by the teacher, as opposed to a "listening" orientation during reading. While such a characterization is clearly limited, it seems appropriate. During arithmetic, too, information might tend to be of a more extended sort than during reading: longer explanatory periods as opposed to brief comments. If this were the case, the FIAC system would reflect the difference most clearly as proportionately greater amounts of class time given to providing information.

Of the seven differences between work in reading and arithmetic that were marginally significant, several can probably be discounted because they represent extremely small amounts of classroom activity per minute of instruction. For example, items 1, 5, and 16 are based on very few tallies of observations. Other differences in this group might have achieved statistical significance had the number of classrooms sampled been only slightly larger. Viewed from a curricular perspective, the tendency for a greater proportion of "narrow" questions to occur during arithmetic instruction, but for more "broad" questions to be posed during reading, seems consistent with the nature of the two subject areas. Questioning behavior by the teacher in the two subject areas may be different because questions posed during arithmetic are used to assess students' knowledge of arithmetic operations and therefore are "narrow" and to the point. But questions arising out of reading instruction tend to deal with interpretive, evaluative, or impressionistic themes, hence are "broad." The drill-oriented, narrow theme of arithmetic may also be the cause of the tendency for more "elicited responses" (item 11) to be made by students during that subject's instruction, while broader, "unelicited responses" are significantly more frequent during work in reading because of its more interactive, less precisely defined qualities.

The tendency for "directed activity" to occur more frequently during teachers' work in arithmetic than during reading is consistent with the nature of classroom structure. The "boardwork" that tends to be a major part of arithmetic instruction is coded as "directed activity"(item 15).

The "direction" of the averaged differences indicated in Table 2 was incorrectly predicted for seven of the criteria (items 1, 2, 3, 4, 9, 13, and 16). This means that my understanding of the place these activities have in the teacher's technology must be flawed. Recall that my reasoning was that most activities during reading would be truncated because of the large measure of time given to "student talk" in the form of oral reading. But in spite of this, teachers also managed to praise more, give more clarification, ask more "broad" questions, give more commands and requests, as well as criticize more during reading. These differences justify a view of reading instruction as probably more "compressed" than arithmetic. Its setting in the small group seems to engender a more intensive approach to the tasks than whole-class instruction does. This interpretation is supported by some data from Gump (1967), indicating that reading groups tend to have the highest levels of on-task behavior as well as the lowest levels of disruption. In short, more teaching (and possibly, learning) can apparently take place in a shorter length of time during the "round-robin" reading circle.

Jackson and Lahaderne Criteria

Control. Does reading differ from arithmetic in the amount of teacher control exercised over its operations? Table 3 summarizes the proportions of teacher-initiated

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Insert Table 3 about here.

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and student-initiated interactions with one person (not the whole class) during a given minute of instructional time in reading and in arithmetic. The comparisons of the subject-area address the issue of whether or not a significantly greater average number of interactions are initiated by the teacher or students during reading compared with arithmetic.

The average number of teacher-initiated and student-initiated interactions with individuals during reading is significantly higher than during arithmetic. Table 3 indicates that during reading the teacher initiates more individual interactions with individual students. This may be a function of the fact that small-group settings inspire such a mode of teacher operation. But it is also probably true that the subject of reading itself necessitates the interaction of individual students and the teacher because it is inherently more difficult to learn and to teach. The small group setting doubtless serves as an aid to students in making individual contacts with the teacher. These student-initiated contacts were proportionately higher during reading. The difficulty of the subject once again would appear to influence the need for students to interact with the teacher. The small-group setting would facilitate this.

Discussion. It is ironic in a sense that the teacher qua reading teacher apparently exercises a larger degree of control over the classroom's proceedings than qua arithmetic teacher, but at the same time the students are more likely to initiate interactions with the teacher. How is such a juxtaposition of control and freedom to be accounted for? The answer seems to lie in the fact that the small-group setting for reading allows both extremes--teacher control and student-initiation--to coexist. The task-oriented nature of the reading group would support the teacher's directiveness, but the smallness of the group would engender student input. Compared to the whole-class methods that predominate in arithmetic, reading

may require this high level of teacher and student input because its intrinsic difficulty requires closer monitoring by the teacher and more participation from students.

Feedback. The Jackson and Lahaderne observational system also allows for the classification of some of the affective qualities in the resolutions of interactions. It is thus possible to ask whether differences in the four types of resolutions are correlated with the two subject matters of reading and arithmetic. The results of the tests are presented in Table 4.

Insert Table 4 about here.

A significant difference exists in the proportion of "negative" resolutions to interactions during reading when compared with arithmetic. Significantly more negative resolutions occur during reading instruction, an outcome that was correctly predicted. No other resolutions were clearly associated with either subject matter.

Discussion. The data on "negative" resolutions are consistent with my expectations concerning the effect that the difficulty of reading would have on the teacher. A major function of the teacher in the reading group is that of a "negative monitor" of the children's orally read passages. The teacher, that is, serves the function of reacting to children's errors in reading, but not particularly to their correctly read passages (cf., Staats and Staats, 1962).

The lack of any clear differences in other types of resolutions was predicted in two cases. But I had also expected there to be more positive resolutions during arithmetic. In fact, the proportion of "positive" resolutions was small in both subjects.

Brophy and Good Criteria

Feedback. A third means of classifying the teaching during reading and arithmetic focusses more microscopically on the nature of feedback given during instruction. The average amounts of 12 types of feedback given per minute of instructional time in reading and in arithmetic are provided in Table 5.

Insert Table 5 about here.

Of the 12 comparisons between reading and arithmetic in terms of feedback differences, three are clearly in support of the hypotheses. Teachers more frequently interrupt students during reading than during arithmetic (item 4). The correct answer is given to the student significantly more frequently during reading instruction (item 8), in contrast to allowing the student to self-correct his own work. Also, significantly more interactions during reading end with no feedback from the teacher, compared to arithmetic (item 5).

In addition to the significant finding, notice can be taken of three activities that strongly suggest real differences between reading and arithmetic, but do not reach an acceptable level of statistical significance. Part-correct responses tend to be affirmed by the teacher more often during reading (item 3), as do incorrect responses (item 6). During reading too there is a tendency for the teacher to call on a second student to read, if the first cannot continue (item 9). The predicted direction of the differences was correct in two of the cases (see Table 1).

Teaching practices in giving feedback then seem consistent with what is understood at this point to be required in reading instruction. The teacher is far more likely to give negative feedback than positive, more likely to give none than

a successfully read passage--that is, one that is completed by the child--is not so much a case of the teacher's ignoring the finished task as communicating the message in a way not easily dealt with by the observational system's categories. Child and teacher do understand that a finished passage is indeed one that is correctly read. But rather than directly acknowledging this, the teacher merely assigns the following passage to the next child in the "round-robin" sequence. This indeed is a tacit signal by the teacher that the performance of the first child was successful.

Summary

Ten of the 36 tests for differences between reading and arithmetic indicated the presence of a significant result. Not all were accurately predicted, however. Another 12 tests resulted in t-ratios with a probability somewhat greater than $p = .05$ but less than $p = .10$.

Conclusions and Implications

That teachers "look more like one another when teaching the same subject than like themselves teaching different ones" has been demonstrated, contingent on the choice of activities used as criterion measures. Some clear differences, consistent with predictions, were discovered, particularly in the greater "negativity" of the reading teacher. More negative resolutions to interactions, more instances of no feedback and interruptions, as well as other activities suggest that the teacher qua reading teacher is, to use Skinner's (1968) term, "aversive." Whether this must be so, and whether or not it affects the rates of learning, cannot be determined here. It does appear that a correlation between some qualities differentiating subject areas can affect the amount of "negativity." Assuming this is true, it raises some significant issues, for example, concerning the limits

of such staples from Skinnerian psychology as the need for positive reinforcement in a technology of teaching. Even given that teachers might be induced to provide more praise or positive resolutions to interactions, the need to provide negative feedback to mistakes during reading would still remain.

While this study is suggestive of many differences existing between the work of the reading and arithmetic teacher, it is, of course, only suggestive. The extremely small sample of classrooms not only enforces severe limits on the possible generality of the study, but probably limits the number of significant differences found to a conservative number. Clearly, more data are required to examine the many issues raised here.

A point should be noted concerning the strictness of the hypothesis. Many significant differences within the work of a single teacher were discovered when reading and arithmetic instruction were compared. These within-classroom differences can be found in another source (Soltz, 1976). However, the nature of differences in a teacher's responses to different subject matter demands tended to be somewhat idiosyncratic. Thus while a number of inner-teacher differences exist, these are not particularly consistent, and therefore not easily traced to general distinctions between reading and arithmetic. The presence of idiosyncracies in how teachers differed from one subject area to the next had the effect of increasing the denominator of the t-ratio (i.e., the among-teacher differences), reducing the number of differences that were significant when the test was made of the six classrooms at once.

An additional factor serving to reduce the number of significant differences in instruction was the "shotgun" method of choosing criteria. It was argued earlier in this paper that we did not know, a priori, which of the measures of observable activity might best reflect subject matter variation. We are closer to knowing this now.

A word should also be included concerning the limitations of interpretation of statistical significance. Clearly, the statistical test is a stringent measure of the difference between work with the two subjects of reading and arithmetic. The tests devised for this study were designed to err conservatively, in order to begin to delimit the number of activities that might more effectively serve to define a "technology of teaching" in the primary classroom. In a practical sense, however, differences between reading and arithmetic instruction that were not statistically significant could nevertheless be argued to have great practical significance. This is due primarily to the different lengths of lesson times that were programmed by the teachers in this study. These naturally occurring times were, it will be recalled, reduced to a common measure in order to allow the six classrooms studied to be directly compared. But if the average lengths of reading and arithmetic lessons are compared in vivo, a lesson in the latter subject averages eleven minutes more instructional time. (Average length of reading lesson = roughly 7 minutes, arithmetic = about 18 minutes). Thus it can be argued that a given student in one of the classrooms sampled for this study would receive about three times more direct instruction in arithmetic than in reading. During an average lesson in reading, a given student would be allowed to read orally for about 11 seconds total, a modest amount of time it would appear. Other projections suggest some additional differences. During arithmetic, there should be about twice as much "accepting of student's inputs," and perhaps seven times as many responses to students questions. Students respond to teacher questions during arithmetic about four times as often as during reading and engage in "directed activity" such as "boardwork" about 10 times as often.

No technology of teaching would be complete without some accounting of the time apportioned out to various activities. The projections cited above simply reinforce the point (cf., Travers, 1971; Wiley and Hannischfeger, 1975).

The data are thus interesting from a descriptive point of view. They can serve as a catalyst to future studies, particularly of the primary classroom. It is clear that observers must begin to recognize that the curricular contexts of their observations are potentially important in determining what they see. Not only is the teacher an important initiator of the activities in the primary room, but she in turn seems to be influenced by curricular factors in what she does. One is reminded of Jacob Getzels' words to the effect that understanding teaching in any given setting means being able answer the question, "who is teaching what to whom by what method?"

Footnotes

[1]Such an assertion is, of course, not without exceptions. But see, for example, Tallmadge and Shearer (1969) and Schutz (1969), who reach similar conclusions.

[2]See n. 1.

[3]The female gender of the personal pronoun is used when referring to all teachers in this study not only in recognition of the fact that all six were women, but to recognize the majority sex of the profession of teaching.

[4]Another way of conceptualizing behavior as linkages is to consider them as "strategies," means of achieving the goals of the curriculum in terms of specific activities employed in the classroom. The activities catalogued by observational systems may then be summarized as "strategic linkages" between the internalized curricular goals of the teacher and external realities of the classroom gestalt.

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TABLE 1

PREDICTED DIFFERENCES IN CLASSROOM ACTIVITIES DURING INSTRUCTION IN READING COMPARED TO ARITHMETIC

Observational System Criterion Activity		Subject Matter in Which Greater Proportion of The Activity is Predicted
Flanders' Categories:		
	Teacher Activities	
"Teacher Talk" "Indirect"	1 Accepts affective expression	Arithmetic
	2 Praises, rewards students	Arithmetic
	3 Accepts, clarifies cognitive input	Arithmetic
	4 Asks "narrow" questions	Arithmetic
	5 Asks "broad" questions	Arithmetic
	6 Responds to student input	Arithmetic
"Teacher Talk" "Direct"	7 Gives information to student	Arithmetic
	8 Gives Feedback to student	Reading
	9 Commands, requests	Arithmetic
	10 Criticizes, rejects student	Reading
	Student Activities:	
"Student Talk"	11 Elicited response from student	Arithmetic
	12 Student reads orally	Reading
	13 Student responds to question	Arithmetic
	14 Student asks question	Arithmetic
	15 Student engages in directed activity	Arithmetic
	16 Silence, contemplation	Arithmetic
	17 Demonstration by student	Arithmetic
	18 Confusion, irrelevant behavior	No Difference

TABLE 1--Continued

Observational System Criterion Activity	Subject Matter in Which Greater Proportion of The Activity Is Predicted
Jackson and Lahaderne Categories:	
1. Teacher-Initiated, Academic Interactions	Reading
2. Student-Initiated, Academic Interactions	Reading
3. Positive Resolution	Arithmetic
4. Negative Resolution	Reading
5. No Resolution	No Difference
6. Neutral Resolution	No Difference
Brophy and Good Categories:	
Type of Feedback	
1. Praise	Arithmetic
2. Affirms Student is Correct	Arithmetic
3. Affirms Student is Part-Correct	Reading
4. Interrupts Student Answer	Reading
5. No Feedback	No Difference
6. Affirms Student Is Incorrect	Reading
7. Criticizes Student	Reading
8. Gives Answer to Student	Reading
9. Asks Another Student to Continue	Arithmetic
10. Repeats the Question, Request	Arithmetic
11. Rephrases the Question, Request	Arithmetic
12. Asks New Question (Same Student)	Arithmetic

TABLE 2

DIFFERENCES IN "TALK" DURING READING AND ARITHMETIC INSTRUCTION IN SIX, THIRD-GRADE CLASSROOMS

Criterion Activity	Subject Matter: Reading	Subject Matter: Arithmetic	S. E. of Difference	t-ratio
Teacher:				
1. Accepts affective input	0.04	0.01	0.02	1.77*
2. Praises, rewards	0.19	0.15	0.06	0,85
3. Accepts cognitive input	2.02	1.80	0.52	0.42
4. Asks narrow questions	2.04	2.96	0.58	-1.59*
5. Asks broad questions	0.52	0.22	0.16	1.85*
6. Responds to student	0.18	0.40	0.16	-1.36
7. Gives information	1.99	2.86	0.29	-2.98**
8. Gives feedback	1.61	0.86	0.45	1.65*
9. Commands, requests	2.73	2.59	0.44	0.32
10. Criticizes, rejects	0.82	0.68	0.30	0.47

TABLE 2--Continued

Criterion Activity	Subject Matter: Reading	Subject Matter: Arithmetic	S.E. of Difference	t-ratio
Student:				
11. Emits elicited response	1.65	2.50	0.49	-1.75*
12. Reads orally	6.51	0.61	0.65	9.14***
13. Emits unelicited response	0.90	0.12	0.21	3.66**
14. Asks question	0.25	0.40	0.11	-1.41
15. "Directed activity"	0.61	2.72	1.31	-1.61*
16. Silence, contemplation	0.74	0.35	0.25	1.55*
17. Demonstration	0.05	0.42	0.15	-2.46**
18. Confusion, irrelevant activity	0.13	0.14	.07	-0.14

NOTE: The entries under the heading, "Subject Matter," are averaged tallies of the criterion activity per minute of instruction. They are based on all observations in each of the six classrooms.

*one-tailed $p \leq .10$, df = 5.

**one-tailed $p \leq .05$, df = 5.

***one-tailed $p \leq .01$, df = 5.

TABLE 3

DIFFERENCES IN TEACHER-INITIATED AND STUDENT-INITIATED INTERACTIONS DURING READING AND ARITHMETIC INSTRUCTION IN SIX, THIRD-GRADE CLASSROOMS

Initiator of Interaction	Subject Matter		S. E. of Difference	t-ratio
	Reading	Arithmetic		
Teacher	0.60	0.40	0.052	3.81*
Student	0.78	0.53	0.084	2.98**

NOTE: Each entry under the heading, "Subject Matter," is an average of the tallies per minute of instructional time in the six classrooms sampled. The averages for each room were based on a ratio of all tallies observed within a given subject matter divided by the total observational time in the subject.

*one-tailed $p \leq .01$, df = 5.

**one-tailed $p \leq .05$, df = 5.

TABLE 4

DIFFERENCES IN RESOLUTIONS TO TEACHER-INITIATED, ACADEMIC INTERACTIONS DURING READING AND ARITHMETIC INSTRUCTION IN SIX, THIRD-GRADE CLASSROOMS

Type of Resolution	Subject Matter		S. E. of Difference	t-ratio
	Reading	Arithmetic		
1. Positive	0.25	0.27	0.07	-0.29
2. Negative	2.15	0.98	0.41	2.86*
3. Neutral	1.68	1.32	0.38	0.95
4. None	1.04	0.87	0.16	1.04

NOTE: Each entry under the heading, "Subject Matter," is an average of the tallies per minute of instructional time in the six classrooms sampled. The averages for each room were based on a ratio of all tallies observed within a given observationalperiod for a given subject matter.

*one-tailed $p \leq .05$, df = 5.

TABLE 5

DIFFERENCES IN TYPES OF FEEDBACK GIVEN BY TEACHERS TO STUDENTS DURING READING AND ARITHMETIC INSTRUCTION IN SIX, THIRD-GRADE CLASSROOMS

Type of Feedback	Subject Matter		S.E. of Difference	t-ratio
	Reading	Arithmetic		
1. Praise	0.22	0.26	0.07	-0.54
2. Affirms correct	2.05	1.87	0.40	0.44
3. Affirms part-correct	0.28	0.08	0.12	1.69*
4. Interrupts student	0.87	0.19	0.21	3.16**
5. None	0.73	0.46	0.10	2.71**
6. Affirms incorrect	0.48	0.33	0.10	1.50*
7. Criticizes	0.64	0.48	0.15	1.07
8. Gives answer	0.95	0.23	0.23	3.15**
9. Asks another student	0.23	0.13	0.07	1.47*
10. Repeats request	0.32	0.41	0.08	-0.98
11. Rephrases request	0.75	0.78	0.19	-0.13
12. Asks new question	4.24	3.50	0.82	0.90

NOTE: The entries under the heading, "Subject Matter," are averaged tallies of the criterion activity per minute of instruction. They are based on all observations in each of the six classrooms, averaged by classroom.

*one-tailed $p \leq .10$, df = 5.

**one-tailed $p \leq .05$, df = 5.